

CLAIMS

I claim:

- 5 1. A method for manufacturing a plurality of resistors
 comprising:
- a) applying a lithographic process for etching a top portion
 of a metal plate for precisely defining a plurality of electrode
 columns on said metal plate;
- 10 2. The method of claim 1 further comprising:
- b) electroplating at least an electrode layer on each of said
 electrode columns to form an electrode for each of said
15 electrode column; and
- c) scribing said metal plate into a plurality of resistors each
 comprising at least two electrodes formed in step b).
- 20 3. The method of claim 1 wherein:
- said step a) of applying a lithographic process for etching a
 top portion of a metal plate is a step of etching a top portion
 of a metal plate comprising nickel-copper alloy.
- 25 4. The method of claim 1 wherein:
- said step b) of electroplating at least an electrode layer on
 each of said electrode columns is a step of electroplating a
30 copper layer and a tin-lead alloy layer on each of said
 electrode columns.

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said step a) of applying a lithographic process for etching a top portion of a metal plate for precisely defining a plurality of electrode columns on said metal plate is a step of forming said electrode columns each having a width and length ranging between 0.1 to 3.2 millimeter, a height ranging between 0.05 to 0.5 millimeters and distance ranging between 0.4 to 6.2 millimeters between every two electrode columns.

8. A method for manufacturing a plurality of resistors comprising:

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a) applying an electroplating process for precisely forming a plurality of column-shaped electrodes on a metal plate.

9. The method of claim 7 further comprising a step:

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b) scribing said metal plate into a plurality of resistors each comprising at least two electrodes formed in step a).

10. The method of claim 8 wherein:

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said step a) of applying an electroplating process for precisely forming a plurality of column-shaped electrodes on a metal plate is a step of electroplating said electrodes on a metal plate comprising nickel-copper alloy.

11. The method of claim 8 wherein:

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said step a) of applying an electroplating process for precisely forming a plurality of column-shaped electrodes is a step of electroplating a copper layer and a tin-lead alloy layer to form each of said electrodes.

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12. The method of claim 8 wherein:

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said step a) of applying an electroplating process for precisely forming a plurality of column-shaped electrodes is a step of forming a plurality of resistors each having a precisely defined resistance ranging between one milli-ohm to one ohm.

13. The method of claim 8 wherein:

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said step a) of applying an electroplating process for precisely forming a plurality of column-shaped electrodes is a step of forming a plurality of resistors each having a thickness ranging between 0.05 to 0.5 millimeters and a length ranging between 1.0 to 7.0 millimeters.

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14. The method of claim 8 wherein:

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said step a) of applying an electroplating process for precisely forming a plurality of column-shaped electrodes is a step of forming said electrodes each having a width and length ranging between 0.1 to 3.2 millimeter, a height ranging between 0.05 to 0.5 millimeters and distance ranging between 0.4 to 6.2 millimeters between every two electrodes.

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15. A resistor array supported on a metal plate composed of a low temperature coefficient of resistance (TCR) metallic material, said resistor array comprising:

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a plurality of electrode columns composed of said low TCR metallic material disposed on said metal plate.

16. The resistor array of claim 15 further comprising:

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at least an electrode layer disposed on each of said electrode columns to form an electrode for each of said electrode columns.

17. The resistor array of claim 15 further comprising:

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a plurality of scribing lines for scribing said metal plate into a plurality of resistors each comprising at least two electrodes.

18. The resistor array of claim 15 wherein:

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said low TCR metallic material composed of said metal plate further comprises a nickel-copper alloy.

19. The resistor array of claim 15 wherein:

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said electrode layer disposed on each of said electrode columns further comprises a copper layer and a tin-lead alloy layer on each of said electrode columns.

20. The resistor array of claim 15 wherein:

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said plurality of electrode columns disposed on said metal plate having a precisely defined position for providing precisely defined resistance for each of said resistors ranging between one milli-ohm to one ohm.

21. The resistor array of claim 15 wherein:

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each of said plurality of resistors having a thickness ranging between 0.05 to 0.5 millimeters and a length ranging between 1.0 to 7.0 millimeters.

22. The resistor array of claim 15 wherein:

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each of said plurality of electrode columns on said metal plate having a width and length ranging between 0.1 to 3.2 millimeter, a height ranging between 0.05 to 0.5 millimeters and distance ranging between 0.4 to 6.2 millimeters between every two electrode columns.

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23. A resistor array supported on a metal plate composed of a low temperature coefficient of resistance (TCR) metallic material, said resistor array comprising:

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a plurality of column-shaped electroplated electrodes disposed on said metal plate composed of said low TCR metallic material.

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24. The resistor array of claim 23 further comprising:

a plurality of scribing lines for scribing said metal plate into a plurality of resistors each comprising at least two electrodes.

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25. The resistor array of claim 23 wherein:

said low TCR metallic material composed of said metal plate
further comprises a nickel-copper alloy.

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26. The resistor array of claim 23 wherein:

said plurality of column-shaped electroplated electrodes
further comprises a copper layer and a tin-lead alloy layer.

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27. The resistor array of claim 23 wherein:

said plurality of column-shaped electroplated electrodes
disposed on said metal plate having a precisely defined
position for providing precisely defined resistance for each
of said resistors ranging between one milli-ohm to one ohm.

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28. The resistor array of claim 23 wherein:

each of said resistors having a thickness ranging between
0.05 to 0.5 millimeters and a length ranging between 1.0 to
7.0 millimeters.

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29. The resistor array of claim 23 wherein:

each of said plurality of column-shaped electrodes having a
width and length ranging between 0.1 to 3.2 millimeter, a
height ranging between 0.05 to 0.5 millimeters and distance
ranging between 0.4 to 6.2 millimeters between every two
electrodes.

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30. A resistor supported on a metal plate composed of a low temperature coefficient of resistance (TCR) metallic material, said resistor comprising:

5 at least two electrode columns composed of said low TCR metallic material disposed on said metal plate.

31. The resistor of claim 26 further comprising:

10 at least an electrode layer disposed on each of said electrode columns to form an electrode for each of said electrode columns.

32. The resistor of claim 30 wherein:

15 said low TCR metallic material composed of said metal plate further comprises a nickel-copper alloy.

33. The resistor of claim 30 wherein:

20 said electrode layer disposed on each of said electrode columns further comprises a copper layer and a tin-lead alloy layer on each of said electrode columns.

34. The resistor of claim 30 wherein:

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said electrode columns disposed on said metal plate having a precisely defined position for providing precisely defined resistance for said resistor ranging between one milli-ohm to one ohm.

35. The resistor of claim 30 wherein:

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said resistor having a thickness ranging between 0.05 to 0.5 millimeters and a length ranging between 1.0 to 7.0 millimeters.

36. The resistor of claim 30 wherein:

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each of said electrode columns on said metal plate having a width and length ranging between 0.1 to 3.2 millimeter, a height ranging between 0.05 to 0.5 millimeters and distance ranging between 0.4 to 6.2 millimeters between every two electrode columns.

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37. A resistor supported on a metal plate composed of a low temperature coefficient of resistance (TCR) metallic material, said resistor comprising:

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at least two column-shaped electroplated electrodes disposed on said metal plate composed of said low TCR metallic material.

38. The resistor of claim 37 wherein:

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said low TCR metallic material composed of said metal plate further comprises a nickel-copper alloy.

39. The resistor of claim 37 wherein:

said column-shaped electroplated electrodes further
comprises a copper layer and a tin-lead alloy layer.

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40. The resistor of claim 37 wherein:

said column-shaped electroplated electrodes disposed on
said metal plate having a precisely defined position for
providing precisely defined resistance for said resistor
ranging between one milli-ohm to one ohm.

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41. The resistor of claim 37 wherein:

said resistor having a thickness ranging between 0.05 to 0.5
millimeters and a length ranging between 1.0 to 7.0
millimeters.

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42. The resistor of claim 37 wherein:

each of said column-shaped electrodes having a width and
length ranging between 0.1 to 3.2 millimeter, a height
ranging between 0.05 to 0.5 millimeters and distance ranging
between 0.4 to 6.2 millimeters between every two electrodes.

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